

SEQUENCE LISTING

<110> Oosumi et al., Teruko
 <120> Solanum Bulbocastanum Late Blight Resistance Gene and Use Thereof
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 <150> 60/407,100
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 Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys Ile Met
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 Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His Leu Asp
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Cys	Cys	Pro	Met	Phe	Val	Ile	Pro	Thr	Leu	Ser	Ser	Val	Lys	Lys	Leu	
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Val	Val	Ser	Gly	Asp	Lys	Ser	Asp	Ala	Ile	Gly	Phe	Ser	Ser	Ile	Ser	
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Leu Asn Ile Ser Phe Tyr Phe Asn Leu Lys Glu Leu Pro Thr Ser Leu	885	890	895	
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Ala Ser Leu Asn Ala Leu Lys His Leu Glu Ile His Ser Cys Tyr Ala	900	905	910	
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Gln Leu Ser Ile Thr Tyr Cys Glu Met Leu Gln Cys Leu Pro Glu Gly	935	940	945	
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Leu Gln His Leu Thr Ala Leu Thr Asn Leu Ser Val Glu Phe Cys Pro	950	955	960	
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Thr Leu Ala Lys Arg Cys Glu Lys Gly Ile Gly Glu Asp Trp Tyr Lys	965	970	975	
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Thr Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His				
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Glu Ile Val Lys Ile Leu Ile Asn Asn Val Ser Asn Ala Gln Thr Leu				
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Pro Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu				
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Phe Ile Leu Ser Lys Gly Asn Leu Glu Leu Glu Asn Val Gly Asn Glu
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Val Trp Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val
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Lys Ser Gly Gln Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu
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Arg Val Leu Asn Leu Ser Asp Ile Lys Leu Lys Gln Leu Pro Ser Ser
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Ile Gly Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Gly Asn Thr
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Ser Ile Arg Ser Leu Pro Asn Gln Leu Cys Lys Leu Gln Asn Leu Gln
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Thr Ser Lys Leu Gly Ser Leu Arg Asn Leu Leu Leu Asp Gly Cys Tyr
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Gly Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys
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Ala Lys Glu Asn Leu His Ser Leu Ser Met Lys Trp Asp Asp Asp Glu
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Ile Arg Leu Pro Asp Trp Met Asn His Ser Val Leu Lys Asn Val Val
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Ile Lys Cys Cys Pro Met Phe Val Ile Pro Thr Leu Ser Ser Val Lys
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Lys Leu Val Val Ser Gly Asp Lys Ser Asp Ala Ile Gly Phe Ser Ser
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Ile Ser Asn Leu Met Ala Leu Thr Ser Leu Gln Ile Arg Tyr Asn Lys
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Lys Tyr Leu Asn Ile Ser Phe Tyr Phe Asn Leu Lys Glu Leu Pro Thr
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Ser Leu Ala Ser Leu Asn Ala Leu Lys His Leu Glu Ile His Ser Cys
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Asn Ala Ala Ala Tyr Glu Ala Asp Asp Ile Leu Asp Glu Cys Lys Thr
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Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His Pro
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aac gtt atc act ttt cgt cac aag att ggg aaa agg atg aaa aag att      395
Asn Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys Ile
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Asp Glu Arg Thr Ile Glu Arg Gln Val Ala Thr Arg Gln Thr Gly
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gataaatcca tagcttactc ataggattag gataggcccc caagtctaaa tgacaggata      727

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gct cca ctt caa aag aag ctt cgg gac ttg ctg aat gga aaa aaa tat	1239
Ala Pro Leu Gln Lys Lys Leu Arg Asp Leu Leu Asn Gly Lys Lys Tyr	
	245 250 255
ttg ctc gtc tta gat gat gtt tgg aat gaa gat caa gat aag tgg gct	1287
Leu Leu Val Leu Asp Asp Val Trp Asn Glu Asp Gln Asp Lys Trp Ala	
	260 265 270
aag tta aga caa gtc ttg aag gtt gga gca agt ggc gct tct gtt cta	1335
Lys Leu Arg Gln Val Leu Lys Val Gly Ala Ser Gly Ala Ser Val Leu	
	275 280 285
acc act act cgt ctt gaa aag gtt gga tca att atg gga aca ttg caa	1383
Thr Thr Thr Arg Leu Glu Lys Val Gly Ser Ile Met Gly Thr Leu Gln	
	290 295 300 305
cca tat gaa ttg tca aat ttg tct caa gaa gat tgt tgg ttg ttg ttc	1431
Pro Tyr Glu Leu Ser Asn Leu Ser Gln Glu Asp Cys Trp Leu Leu Phe	
	310 315 320
atg caa cgt gca ttt ggg cac caa gaa gaa ata aat ctt aat ctt gtg	1479
Met Gln Arg Ala Phe Gly His Gln Glu Glu Ile Asn Leu Asn Leu Val	
	325 330 335
gct atc gga aag gag att gtg aaa aaa tgt ggt ggt gtg cct cta gca	1527
Ala Ile Gly Lys Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu Ala	
	340 345 350
gct aaa act ctt gga ggt att ttg cgc ttt aag aga gaa gaa aga cag	1575
Ala Lys Thr Leu Gly Gly Ile Leu Arg Phe Lys Arg Glu Glu Arg Gln	
	355 360 365

tgg gaa cat gtg aga gat agt gag att tgg aaa ttg cct caa gaa gaa	1623
Trp Glu His Val Arg Asp Ser Glu Ile Trp Lys Leu Pro Gln Glu Glu	
370 375 380 385	
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Ser Ser Ile Leu Pro Ala Leu Arg Leu Ser Tyr His His Leu Pro Leu	
390 395 400	
gat ttg aga caa tgc ttt aca tat tgt gca gta ttc cca aag gat acc	1719
Asp Leu Arg Gln Cys Phe Thr Tyr Cys Ala Val Phe Pro Lys Asp Thr	
405 410 415	
gaa atg gaa aag gga aat cta atc tct ctc tgg atg gca cat ggt ttt	1767
Glu Met Glu Lys Gly Asn Leu Ile Ser Leu Trp Met Ala His Gly Phe	
420 425 430	
att tta tcg aaa gga aac ttg gag cta gag aat gta ggt aat gaa gta	1815
Ile Leu Ser Lys Gly Asn Leu Glu Leu Glu Asn Val Gly Asn Glu Val	
435 440 445	
tgg aat gaa tta tac ttg agg tct ttc ttc caa gag att gaa gtt aaa	1863
Trp Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val Lys	
450 455 460 465	
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Ser Gly Gln Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu Ala	
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aca tct cta ttt tcg gca agc aca tca agc agc aat atc cga gaa ata	1959
Thr Ser Leu Phe Ser Ala Ser Thr Ser Ser Ser Asn Ile Arg Glu Ile	
485 490 495	
att gta gaa aat tac ata cat atg atg tcc att ggt ttc act aaa gtg	2007
Ile Val Glu Asn Tyr Ile His Met Met Ser Ile Gly Phe Thr Lys Val	
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gta tct tct tac tct ctt tcc cac ttg cag aag ttt gtc tcg ttg agg	2055
Val Ser Ser Tyr Ser Leu Ser His Leu Gln Lys Phe Val Ser Leu Arg	
515 520 525	
gtg ctt aat cta agt gac ata aaa ctt aag cag tta ccg tct tcc att	2103
Val Leu Asn Leu Ser Asp Ile Lys Leu Lys Gln Leu Pro Ser Ser Ile	
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Gly Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Gly Asn Thr Ser	
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att cgt agt ctt cca aac cag tta tgc aag ctt caa aat ctg cag act	2199
Ile Arg Ser Leu Pro Asn Gln Leu Cys Lys Leu Gln Asn Leu Gln Thr	
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ctt gat cta cat ggc tgt cat tca ctt tgt tgt ttg cca aaa gaa aca	2247
Leu Asp Leu His Gly Cys His Ser Leu Cys Cys Leu Pro Lys Glu Thr	
580 585 590	
agc aaa ctt ggt agt ctt cga aat ctt tta ctt gat ggt tgc tat gga	2295
Ser Lys Leu Gly Ser Leu Arg Asn Leu Leu Leu Asp Gly Cys Tyr Gly	
595 600 605	

ttg act tgt atg cca cca agg ata gga tct ttg aca tgc ctt aag act	2343
Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr	
610 615 620 625	
cta agt aga ttt gtg gtg gga att cag aag aaa agt tgt caa ctt ggt	2391
Leu Ser Arg Phe Val Val Gly Ile Gln Lys Lys Ser Cys Gln Leu Gly	
630 635 640	
gaa tta cga aac ctg aat ctc tat ggc tca att gaa atc acg cat ctt	2439
Glu Leu Arg Asn Leu Asn Leu Tyr Gly Ser Ile Glu Ile Thr His Leu	
645 650 655	
gag aga gtg aag aat gat atg gat gca aaa gaa gcc aat tta tct gca	2487
Glu Arg Val Lys Asn Asp Met Asp Ala Lys Glu Ala Asn Leu Ser Ala	
660 665 670	
aaa gaa aat ctg cat tct tta agc atg aaa tgg gat gac gat gaa cgt	2535
Lys Glu Asn Leu His Ser Leu Ser Met Lys Trp Asp Asp Asp Glu Arg	
675 680 685	
cca cgt ata tat gaa tca gaa aaa gtt gaa gtg ctt gaa gct ctc aaa	2583
Pro Arg Ile Tyr Glu Ser Glu Lys Val Glu Val Leu Glu Ala Leu Lys	
690 695 700 705	
cca cac tcc aat ctg act tgt tta aca atc agg ggc ttc aga gga atc	2631
Pro His Ser Asn Leu Thr Cys Leu Thr Ile Arg Gly Phe Arg Gly Ile	
710 715 720	
cgt ctc cca gac tgg atg aat cac tca gtt ttg aaa aat gtt gtc tct	2679
Arg Leu Pro Asp Trp Met Asn His Ser Val Leu Lys Asn Val Val Ser	
725 730 735	
att gaa atc atc agt tgc aaa aac tgc tca tgc tta cca ccc ttt ggt	2727
Ile Glu Ile Ile Ser Cys Lys Asn Cys Ser Cys Leu Pro Phe Gly	
740 745 750	
gag ctg cct tgt cta aaa agt cta gag tta tgg agg ggg tct gcg gaa	2775
Glu Leu Pro Cys Leu Lys Ser Leu Glu Leu Trp Arg Gly Ser Ala Glu	
755 760 765	
gtg gag tat gtt gat tct gga ttc cct aca aga aga agg ttt cca tct	2823
Val Glu Tyr Val Asp Ser Gly Phe Pro Thr Arg Arg Arg Phe Pro Ser	
770 775 780 785	
ctg aga aaa ctt aat ata cgc gaa ttt gat aat ctg aaa gga ttg ctg	2871
Leu Arg Lys Leu Asn Ile Arg Glu Phe Asp Asn Leu Lys Gly Leu Leu	
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aaa aag gaa gga gaa gag caa tgc cct gtg ctt gaa gag ata gag att	2919
Lys Lys Glu Gly Glu Glu Gln Cys Pro Val Leu Glu Glu Ile Glu Ile	
805 810 815	
aaa tgt tgc cct atg ttt gtt att cca acc ctt tct tct gtc aag aaa	2967
Lys Cys Cys Pro Met Phe Val Ile Pro Thr Leu Ser Ser Val Lys Lys	
820 825 830	
ttg gta gtt agt ggg gac aag tca gat gca ata ggt ttc agt tcc ata	3015
Leu Val Val Ser Gly Asp Lys Ser Asp Ala Ile Gly Phe Ser Ser Ile	
835 840 845	
tct aat ctc atg gct ctt act tcc ctc caa att cgc tat aac aaa gaa	3063

Ser	Asn	Leu	Met	Ala	Leu	Thr	Ser	Leu	Gln	Ile	Arg	Tyr	Asn	Lys	Glu		
850					855					860					865		
gat	gct	tca	ctc	cca	gaa	gag	atg	ttc	aaa	agc	ctt	gca	aat	ctc	aaa	3111	
Asp	Ala	Ser	Leu	Pro	Glu	Glu	Met	Phe	Lys	Ser	Leu	Ala	Asn	Leu	Lys		
				870					875					880			
tac	ttg	aat	atc	tct	ttt	tac	ttc	aat	ctt	aaa	gag	ctg	cct	acc	agc	3159	
Tyr	Leu	Asn	Ile	Ser	Phe	Tyr	Phe	Asn	Leu	Lys	Glu	Leu	Pro	Thr	Ser		
			885					890					895				
ctg	gct	agt	ctc	aat	gct	ttg	aag	cat	ctg	gaa	att	cat	agt	tgt	tat	3207	
Leu	Ala	Ser	Leu	Asn	Ala	Leu	Lys	His	Leu	Glu	Ile	His	Ser	Cys	Tyr		
		900					905					910					
gca	cta	gag	agt	ctc	ccc	gag	gaa	ggg	gtg	aaa	ggg	tta	att	tca	ctc	3255	
Ala	Leu	Glu	Ser	Leu	Pro	Glu	Glu	Gly	Val	Lys	Gly	Leu	Ile	Ser	Leu		
	915					920				925							
aca	cag	tta	tcc	ata	aca	tac	tgt	gaa	atg	cta	caa	tgt	tta	ccg	gag	3303	
Thr	Gln	Leu	Ser	Ile	Thr	Tyr	Cys	Glu	Met	Leu	Gln	Cys	Leu	Pro	Glu		
930					935					940					945		
gga	ttg	cag	cac	cta	aca	gcc	ctc	aca	aat	tta	tca	gtt	gag	ttt	tgt	3351	
Gly	Leu	Gln	His	Leu	Thr	Ala	Leu	Thr	Asn	Leu	Ser	Val	Glu	Phe	Cys		
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cca	aca	ctg	gcc	aag	cgg	tgt	gag	aag	gga	ata	gga	gaa	gac	tgg	tac	3399	
Pro	Thr	Leu	Ala	Lys	Arg	Cys	Glu	Lys	Gly	Ile	Gly	Glu	Asp	Trp	Tyr		
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aaa	att	gct	cac	att	cct	cgt	gtg	ttt	att	tat	tagtattccc	aattagatgt				3452	
Lys	Ile	Ala	His	Ile	Pro	Arg	Val	Phe	Ile	Tyr							
		980					985										
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ttgatttttc	ttgggtctgt	aacaataaat	atttgaaatt	tttcatatta	agattcagaa											3572	
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		20						25					30				
Lys	Leu	Gln	Ser	Thr	Phe	Thr	Thr	Ile	Gln	Ala	Val	Leu	Glu	Asp	Ala		
		35					40					45					

Gln Lys Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu Gln Lys
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Leu Asn Ala Ala Ala Tyr Glu Ala Asp Asp Ile Leu Asp Glu Cys Lys
65 70 75 80

Thr Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His
85 90 95

Pro Asn Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys
100 105 110

Ile Met Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His
115 120 125

Leu Asp Glu Arg Thr Ile Glu Arg Gln Val Ala Thr Arg Gln Thr Gly
130 135 140

Phe Val Leu Asn Glu Pro Gln Val Tyr Gly Arg Asp Lys Glu Lys Asp
145 150 155 160

Glu Ile Val Lys Ile Leu Ile Asn Asn Val Ser Asn Ala Gln Thr Leu
165 170 175

Pro Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu
180 185 190

Ala Gln Met Val Phe Asn Asp Gln Arg Val Ile Glu His Phe His Pro
195 200 205

Lys Ile Trp Ile Cys Val Ser Glu Asp Phe Asn Glu Lys Arg Leu Ile
210 215 220

Lys Glu Ile Val Glu Ser Ile Glu Glu Lys Ser Leu Gly Gly Met Asp
225 230 235 240

Leu Ala Pro Leu Gln Lys Lys Leu Arg Asp Leu Leu Asn Gly Lys Lys
245 250 255

Tyr Leu Leu Val Leu Asp Asp Val Trp Asn Glu Asp Gln Asp Lys Trp
260 265 270

Ala Lys Leu Arg Gln Val Leu Lys Val Gly Ala Ser Gly Ala Ser Val
275 280 285

Leu Thr Thr Thr Arg Leu Glu Lys Val Gly Ser Ile Met Gly Thr Leu

290		295		300
Gln Pro Tyr Glu Leu Ser Asn Leu Ser Gln Glu Asp Cys Trp Leu Leu				
305		310		315 320
Phe Met Gln Arg Ala Phe Gly His Gln Glu Glu Ile Asn Leu Asn Leu				
	325		330	335
Val Ala Ile Gly Lys Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu				
	340		345	350
Ala Ala Lys Thr Leu Gly Gly Ile Leu Arg Phe Lys Arg Glu Glu Arg				
	355		360	365
Gln Trp Glu His Val Arg Asp Ser Glu Ile Trp Lys Leu Pro Gln Glu				
	370		375	380
Glu Ser Ser Ile Leu Pro Ala Leu Arg Leu Ser Tyr His His Leu Pro				
	385		390	395 400
Leu Asp Leu Arg Gln Cys Phe Thr Tyr Cys Ala Val Phe Pro Lys Asp				
	405		410	415
Thr Glu Met Glu Lys Gly Asn Leu Ile Ser Leu Trp Met Ala His Gly				
	420		425	430
Phe Ile Leu Ser Lys Gly Asn Leu Glu Leu Glu Asn Val Gly Asn Glu				
	435		440	445
Val Trp Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val				
	450		455	460
Lys Ser Gly Gln Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu				
	465		470	475 480
Ala Thr Ser Leu Phe Ser Ala Ser Thr Ser Ser Ser Asn Ile Arg Glu				
	485		490	495
Ile Ile Val Glu Asn Tyr Ile His Met Met Ser Ile Gly Phe Thr Lys				
	500		505	510
Val Val Ser Ser Tyr Ser Leu Ser His Leu Gln Lys Phe Val Ser Leu				
	515		520	525
Arg Val Leu Asn Leu Ser Asp Ile Lys Leu Lys Gln Leu Pro Ser Ser				
	530		535	540

Ile Gly Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Gly Asn Thr
545 550 555 560

Ser Ile Arg Ser Leu Pro Asn Gln Leu Cys Lys Leu Gln Asn Leu Gln
565 570 575

Thr Leu Asp Leu His Gly Cys His Ser Leu Cys Cys Leu Pro Lys Glu
580 585 590

Thr Ser Lys Leu Gly Ser Leu Arg Asn Leu Leu Leu Asp Gly Cys Tyr
595 600 605

Gly Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys
610 615 620

Thr Leu Ser Arg Phe Val Val Gly Ile Gln Lys Lys Ser Cys Gln Leu
625 630 635 640

Gly Glu Leu Arg Asn Leu Asn Leu Tyr Gly Ser Ile Glu Ile Thr His
645 650 655

Leu Glu Arg Val Lys Asn Asp Met Asp Ala Lys Glu Ala Asn Leu Ser
660 665 670

Ala Lys Glu Asn Leu His Ser Leu Ser Met Lys Trp Asp Asp Asp Glu
675 680 685

Arg Pro Arg Ile Tyr Glu Ser Glu Lys Val Glu Val Leu Glu Ala Leu
690 695 700

Lys Pro His Ser Asn Leu Thr Cys Leu Thr Ile Arg Gly Phe Arg Gly
705 710 715 720

Ile Arg Leu Pro Asp Trp Met Asn His Ser Val Leu Lys Asn Val Val
725 730 735

Ser Ile Glu Ile Ile Ser Cys Lys Asn Cys Ser Cys Leu Pro Pro Phe
740 745 750

Gly Glu Leu Pro Cys Leu Lys Ser Leu Glu Leu Trp Arg Gly Ser Ala
755 760 765

Glu Val Glu Tyr Val Asp Ser Gly Phe Pro Thr Arg Arg Arg Phe Pro
770 775 780

Ser Leu Arg Lys Leu Asn Ile Arg Glu Phe Asp Asn Leu Lys Gly Leu
785 790 795 800

Leu Lys Lys Glu Gly Glu Glu Gln Cys Pro Val Leu Glu Glu Ile Glu
805 810 815

Ile Lys Cys Cys Pro Met Phe Val Ile Pro Thr Leu Ser Ser Val Lys
820 825 830

Lys Leu Val Val Ser Gly Asp Lys Ser Asp Ala Ile Gly Phe Ser Ser
835 840 845

Ile Ser Asn Leu Met Ala Leu Thr Ser Leu Gln Ile Arg Tyr Asn Lys
850 855 860

Glu Asp Ala Ser Leu Pro Glu Glu Met Phe Lys Ser Leu Ala Asn Leu
865 870 875 880

Lys Tyr Leu Asn Ile Ser Phe Tyr Phe Asn Leu Lys Glu Leu Pro Thr
885 890 895

Ser Leu Ala Ser Leu Asn Ala Leu Lys His Leu Glu Ile His Ser Cys
900 905 910

Tyr Ala Leu Glu Ser Leu Pro Glu Glu Gly Val Lys Gly Leu Ile Ser
915 920 925

Leu Thr Gln Leu Ser Ile Thr Tyr Cys Glu Met Leu Gln Cys Leu Pro
930 935 940

Glu Gly Leu Gln His Leu Thr Ala Leu Thr Asn Leu Ser Val Glu Phe
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caa ggg gaa gtt gga ttg att ctt ggt ttt aag gat gag ttc gaa aag 155
Gln Gly Glu Val Gly Leu Ile Leu Gly Phe Lys Asp Glu Phe Glu Lys
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ctt caa agc aca ttt act aca atc caa gct gtg cta gaa gat gct cag 203
Leu Gln Ser Thr Phe Thr Thr Ile Gln Ala Val Leu Glu Asp Ala Gln
35 40 45

aag aag caa ttg aag gac aag gca ata gaa aat tgg ttg cag aaa ctc 251
Lys Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu Gln Lys Leu
50 55 60 65

aat gct gct gta tat gaa gct gac gac atc ttg gac gaa tgt aaa act 299
Asn Ala Ala Val Tyr Glu Ala Asp Asp Ile Leu Asp Glu Cys Lys Thr
70 75 80

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Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His Pro
85 90 95

aac gtt atc gct ttc cgt cac aag att ggg aaa agg atg aaa aag att 395
Asn Val Ile Ala Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys Ile
100 105 110

atg gag aaa cta gat gta att gca gcg gaa cga att aag ttt cat ttg 443
Met Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His Leu
115 120 125

gct gaa agg act aca gag aga caa gtt gct aca cgc caa aca ggt gct 491
Ala Glu Arg Thr Thr Glu Arg Gln Val Ala Thr Arg Gln Thr Gly Ala
130 135 140 145

cat ctt aga tat ttt tct aaaaaaacag ctttatatca tgaaattcat 539
His Leu Arg Tyr Phe Ser
150

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cagatttgga tatattaata tattatctaa atttgtttcg tgaaattttt aacagataaa 659

gectgagttg ttttagacat tataaattaa caatgataat aatgtgaatt caaaaaagtg 719

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Asn Asp Gln Arg Val Ile Glu His Phe Leu Pro Lys Ile Trp Ile Cys	
215 220 225	
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Val Ser Glu Asp Phe Asn Glu Lys Arg Leu Ile Lys Glu Ile Val Glu	
230 235 240 245	
tct att gaa gaa aag tca ctt ggt gac atg gac ttg gct cca ctt caa	1118
Ser Ile Glu Glu Lys Ser Leu Gly Asp Met Asp Leu Ala Pro Leu Gln	
250 255 260	
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Lys Lys Leu Gln Asp Leu Leu Asn Gly Lys Lys Tyr Leu Leu Val Leu	
265 270 275	
gat gat att tgg aat gaa gat caa gat aag tgg gct aag tta cga gaa	1214
Asp Asp Ile Trp Asn Glu Asp Gln Asp Lys Trp Ala Lys Leu Arg Glu	
280 285 290	
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Val Leu Lys Val Gly Ala Ser Gly Ala Ser Ile Leu Thr Thr Thr Arg	
295 300 305	
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Leu Glu Lys Val Gly Ser Ile Met Gln Thr Leu Gln Pro Tyr Glu Leu	
310 315 320 325	
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Ser Asn Leu Cys Gln Glu Asp Cys Trp Leu Leu Phe Met Gln Arg Ala	
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Phe Gly His Gln Glu Glu Ile Asn His Asn Leu Val Ala Ile Gly Lys	
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Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu Ala Ala Lys Thr Leu	
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gga ggt att ttg cga ttc aag aga caa gaa aga cag tgg gaa cat gtg	1502
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375 380 385	

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gaa aat cta atc tct ctc tgg atg gca cat ggt ttt ctt tta tcg aaa Glu Asn Leu Ile Ser Leu Trp Met Ala His Gly Phe Leu Leu Ser Lys 440 445 450	1694
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ccc aag cag tta tgc aag ctt caa aat ctg cag act ctt gat cta cgt Pro Lys Gln Leu Cys Lys Leu Gln Asn Leu Gln Thr Leu Asp Leu Arg 585 590 595	2126
tgt tgc tac aga ctt tct tgt ttg cca aaa gaa aca agc aaa ctt ggt Cys Cys Tyr Arg Leu Ser Cys Leu Pro Lys Glu Thr Ser Lys Leu Gly 600 605 610	2174
agt ctc cga aat ctt tta ctt gat cgt tgc cat gga ttg act tgt atg Ser Leu Arg Asn Leu Leu Leu Asp Arg Cys His Gly Leu Thr Cys Met 615 620 625	2222

cca cca agg ata gga tca ttg aca tgc ctt aag act cta gat cgc ttt Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr Leu Asp Arg Phe 630 635 640 645	2270
gca atg gga agg gag aaa agt cct caa att ggt gaa tta cga aac ctg Ala Met Gly Arg Glu Lys Ser Pro Gln Ile Gly Glu Leu Arg Asn Leu 650 655 660	2318
aat ctc tat ggc tca att tca atc acg cat ctt gag aga gtg aag aat Asn Leu Tyr Gly Ser Ile Ser Ile Thr His Leu Glu Arg Val Lys Asn 665 670 675	2366
gat atg gat gca aaa gaa gcc aat tta tct tca aaa gaa aat ctg cat Asp Met Asp Ala Lys Glu Ala Asn Leu Ser Ser Lys Glu Asn Leu His 680 685 690	2414
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tca gaa gat gtt gaa gtg ctt gaa gcc ctc aaa cca cac tcc aat ctg Ser Glu Asp Val Glu Val Leu Glu Ala Leu Lys Pro His Ser Asn Leu 710 715 720 725	2510
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tgc aaa aac tgc tca tgc tta cca ccc ttt ggt gaa ctg cct tgt cta Cys Lys Asn Cys Ser Cys Leu Pro Pro Phe Gly Glu Leu Pro Cys Leu 760 765 770	2654
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			20					25					30		
Lys	Leu	Gln	Ser	Thr	Phe	Thr	Thr	Ile	Gln	Ala	Val	Leu	Glu	Asp	Ala
		35					40					45			
Gln	Lys	Lys	Gln	Leu	Lys	Asp	Lys	Ala	Ile	Glu	Asn	Trp	Leu	Gln	Lys
	50					55					60				
Leu	Asn	Ala	Ala	Val	Tyr	Glu	Ala	Asp	Asp	Ile	Leu	Asp	Glu	Cys	Lys
65					70					75					80

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Pro Asn Val Ile Ala Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys
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Ile Met Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His
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Ala His Leu Arg Tyr Phe Ser Leu Thr Pro Thr Glu Leu Gly Pro Gly
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Phe Val Leu Asn Glu Pro Gln Val Tyr Gly Arg Asp Lys Glu Lys Asp
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Glu Ile Val Lys Ile Leu Ile Asn Ile Val Ser Asp Ala Gln Thr Leu
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Ser Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu
195 200 205

Ala Gln Met Val Phe Asn Asp Gln Arg Val Ile Glu His Phe Leu Pro
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Lys Ile Trp Ile Cys Val Ser Glu Asp Phe Asn Glu Lys Arg Leu Ile
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Lys Glu Ile Val Glu Ser Ile Glu Glu Lys Ser Leu Gly Asp Met Asp
245 250 255

Leu Ala Pro Leu Gln Lys Lys Leu Gln Asp Leu Leu Asn Gly Lys Lys
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Tyr Leu Leu Val Leu Asp Asp Ile Trp Asn Glu Asp Gln Asp Lys Trp
275 280 285

Ala Lys Leu Arg Glu Val Leu Lys Val Gly Ala Ser Gly Ala Ser Ile
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Gln Pro Tyr Glu Leu Ser Asn Leu Cys Gln Glu Asp Cys Trp Leu Leu
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Phe Met Gln Arg Ala Phe Gly His Gln Glu Glu Ile Asn His Asn Leu
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Val Ala Ile Gly Lys Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu
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Ala Ala Lys Thr Leu Gly Gly Ile Leu Arg Phe Lys Arg Gln Glu Arg
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Gln Trp Glu His Val Arg Asp Ser Glu Ile Trp Lys Leu Pro Gln Glu
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Glu Ser Ser Ile Leu Pro Ala Leu Lys Leu Ser Tyr His His Leu Pro
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Leu Asp Leu Arg Gln Cys Phe Ser Tyr Cys Ala Val Phe Pro Lys Asp
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Val Trp Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val
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Thr Tyr Gly Lys Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu
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Ile Asn Val Lys Gly Tyr Pro His Met Met Ser Ile Gly Phe Ala Lys
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Arg Val Leu Asn Leu Ser Asn Leu Glu Leu Lys Gln Leu Pro Ser Ser
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Ile Gly Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Asp Asn Asn
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Arg Ile Arg Ser Leu Pro Lys Gln Leu Cys Lys Leu Gln Asn Leu Gln
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Gly Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys
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Glu Leu Arg Asn Leu Asn Leu Tyr Gly Ser Ile Ser Ile Thr His Leu
660 665 670

Glu Arg Val Lys Asn Asp Met Asp Ala Lys Glu Ala Asn Leu Ser Ser
675 680 685

Lys Glu Asn Leu His Ser Leu Ser Met Ile Trp Asp Glu Asp Glu Arg
690 695 700

Pro His Arg Tyr Glu Ser Glu Asp Val Glu Val Leu Glu Ala Leu Lys
705 710 715 720

Pro His Ser Asn Leu Thr Cys Leu Thr Ile Ile Gly Phe Arg Gly Ile
725 730 735

Arg Leu Pro Asp Trp Met Asn His Ser Val Leu Lys Asn Val Val Ser
740 745 750

Leu Glu Ile Ser Asp Cys Lys Asn Cys Ser Cys Leu Pro Pro Phe Gly
755 760 765

Glu Leu Pro Cys Leu Asn Ser Leu Gln Leu Trp Ser Gly Ser Ala Glu
770 775 780

Val Glu Tyr Ile Asp Ser Gly Phe Pro Thr Arg Arg Arg Phe Pro Ser
785 790 795 800

Leu Arg Lys Leu Ile Ile Gly Glu Phe Asp Asn Leu Lys Gly Leu Val

805

810

815

Lys Lys Glu Gly Glu Glu Gln Phe Pro Val Leu Glu Glu Met Glu Ile
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Asn Trp Cys Pro Met Phe Val Ile Pro Thr Leu Ser Ser Val Asn Lys
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Leu Val Val Ser Gly Glu Glu Ser Asp Ala Ile Gly Phe Ser Ser Ile
 850 855 860

Ser Asn Leu Arg Ala Leu Thr Ser Leu Asn Ile Ser Tyr Asn Ser Glu
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Ala Thr Ser Leu Pro Glu Glu Met Phe Lys Ser Leu Ala Asn Leu Lys
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Tyr Leu Asn Ile Tyr Tyr Phe Lys Asn Leu Lys Glu Leu Pro Thr Asn
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 930 935 940

Thr Gln Leu Ser Ile Thr Tyr Cys Thr Met Leu Gln Cys Leu Ser Glu
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Gly Leu Gln His Leu Thr Ala Leu Thr Asn Leu Ser Val Arg Asp Cys
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 Ile Gln Gly Glu Leu Val Leu Leu Phe Gly Phe Glu Asn Asp Phe Arg
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 aag ctt tca agc aca ttt tct acg atc caa ctt gtg ctt gaa gat gct 201
 Lys Leu Ser Ser Thr Phe Ser Thr Ile Gln Leu Val Leu Glu Asp Ala
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 Ser Glu Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu Gln Lys
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 Leu Asn Phe Ala Ala Tyr Glu Val Asp Asp Ile Leu Asp Glu Cys Lys
 65 70 75 80
 aat gag gca gca aga ttc aat cag tcc tta tta ggg tat att cat cca 345
 Asn Glu Ala Ala Arg Phe Asn Gln Ser Leu Leu Gly Tyr Ile His Pro
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 aag atc atc att ttt cgt tac aag ctc gga aaa aga atg aaa aga atg 393
 Lys Ile Ile Ile Phe Arg Tyr Lys Leu Gly Lys Arg Met Lys Arg Met
 100 105 110
 atg gag aaa cta gat gca att gct gac gaa aga agg aag ttt cat ttg 441
 Met Glu Lys Leu Asp Ala Ile Ala Asp Glu Arg Arg Lys Phe His Leu
 115 120 125
 cgt gca aag att gtc gag aaa caa gct tct aaa cgt gaa aca ggt gct 489
 Arg Ala Lys Ile Val Glu Lys Gln Ala Ser Lys Arg Glu Thr Gly Ala
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 cca aaa gtt tat gga agg gac aaa gag aag gat gag atg gtg aaa atc 759
 Pro Lys Val Tyr Gly Arg Asp Lys Glu Lys Asp Glu Met Val Lys Ile

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Leu Ile Asn Ser Val Ser Asn Ala Gln Glu Leu Leu Val Leu Pro Ile	185	190	195	
ctt ggt atg ggg gga cta gga aag aca aca ctt gcc caa atg att ttt				855
Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu Ala Gln Met Ile Phe	200	205	210	
aat gat cag agc gtg act gca cat ttc aat cta aag ata tgg gtt tgt				903
Asn Asp Gln Ser Val Thr Ala His Phe Asn Leu Lys Ile Trp Val Cys	215	220	225	
gtc tca gat gat ttt gat gag aag agg ttg ata aag gca att gta gaa				951
Val Ser Asp Asp Phe Asp Glu Lys Arg Leu Ile Lys Ala Ile Val Glu	230	235	240	
tct att gaa aga agg cca ctt ggt gac ata gac ttg gct ccc ctc cag				999
Ser Ile Glu Arg Arg Pro Leu Gly Asp Ile Asp Leu Ala Pro Leu Gln	245	250	255	260
aag aag ctt cag gag ttg ttg aat gga aaa aga tac ttt ctt gtt tta				1047
Lys Lys Leu Gln Glu Leu Leu Asn Gly Lys Arg Tyr Phe Leu Val Leu	265	270	275	
gat gat gtt tgg aat gaa gat caa gaa aag tgg gct aag ata aaa gca				1095
Asp Asp Val Trp Asn Glu Asp Gln Glu Lys Trp Ala Lys Ile Lys Ala	280	285	290	
gtc tta aag gtt gga gca caa ggt tct tct att cta gcc act act cgt				1143
Val Leu Lys Val Gly Ala Gln Gly Ser Ser Ile Leu Ala Thr Thr Arg	295	300	305	
ctt gaa agg gtc gga tca att atg gga act tgg caa cca tat cag tta				1191
Leu Glu Arg Val Gly Ser Ile Met Gly Thr Trp Gln Pro Tyr Gln Leu	310	315	320	
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Ser Ile Leu Ser Pro Glu Tyr Cys Trp Leu Leu Phe Lys Gln Arg Ala	325	330	335	340
ttt ggc cac caa acg gaa aca aat cct gcc ctt gtg ggg att gga aaa				1287
Phe Gly His Gln Thr Glu Thr Asn Pro Ala Leu Val Gly Ile Gly Lys	345	350	355	
gag att gtg aag aaa tgt ggg ggt gtg cct cta gca gcc aag act ctt				1335
Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu Ala Ala Lys Thr Leu	360	365	370	
gga ggt ctt tta cgc ttc aag aga gaa gaa agt gaa tgg gaa cat gtg				1383
Gly Gly Leu Leu Arg Phe Lys Arg Glu Glu Ser Glu Trp Glu His Val	375	380	385	
aaa gat agt gag att tgg aat tta cct caa gat gaa aat tct gtt ttg				1431
Lys Asp Ser Glu Ile Trp Asn Leu Pro Gln Asp Glu Asn Ser Val Leu	390	395	400	
cct tcc ctg agg ctg agt tat cat cac ctt cca ctt aat ttg aga caa				1479
Pro Ser Leu Arg Leu Ser Tyr His His Leu Pro Leu Asn Leu Arg Gln	405	410	415	420

tgt ttt gca tat tgt gcg gta ttc cca aag gac acc aaa ata gaa aag	1527
Cys Phe Ala Tyr Cys Ala Val Phe Pro Lys Asp Thr Lys Ile Glu Lys	
425 430 435	
gaa tat ctc atc act ctc tgg atg gca cat ggt ttt ctt tta tca aaa	1575
Glu Tyr Leu Ile Thr Leu Trp Met Ala His Gly Phe Leu Leu Ser Lys	
440 445 450	
gaa aat tca gag cta gag gat gtg ggt aat gaa gta tgg aaa gaa tta	1623
Glu Asn Ser Glu Leu Glu Asp Val Gly Asn Glu Val Trp Lys Glu Leu	
455 460 465	
tac ttg agg tct ttc ttc caa gag gtc gaa gaa tat aaa ttt ggt aat	1671
Tyr Leu Arg Ser Phe Phe Gln Glu Val Glu Glu Tyr Lys Phe Gly Asn	
470 475 480	
act tat ttc aag atg cat gat ctc atc cac gat ttg gct aca tct ctg	1719
Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu Ala Thr Ser Leu	
485 490 495 500	
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Phe Ser Thr Asn Thr Arg Ser Ser Lys Ile Arg Gln Ile Arg Val Ala	
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Gln Lys Asn Thr Ile Pro Ile Gly Phe Ala Glu Val Val Pro Ser Tyr	
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Ser Pro Leu Ile Phe Lys Arg Phe Val Ser Leu Arg Val Leu Asp Met	
535 540 545	
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Lys Phe Ser Lys Phe Asp Gln Leu Ser Ser Ser Ile Gly Asp Leu Ile	
550 555 560	
cat tta agg ttg ttg aac ttg cgt ggc agt agc att cgt agc ctt cca	1959
His Leu Arg Leu Leu Asn Leu Arg Gly Ser Ser Ile Arg Ser Leu Pro	
565 570 575 580	
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Lys Arg Leu Cys Lys Leu Gln Asn Leu Gln Thr Leu Asp Ile Ser Cys	
585 590 595	
tgt ttc tca ctt tct tat att cca aaa caa ata agt aaa tta agt agt	2055
Cys Phe Ser Leu Ser Tyr Ile Pro Lys Gln Ile Ser Lys Leu Ser Ser	
600 605 610	
ctt aga aat ctt gtg ttc agt ggt tgt caa ata act tct atg cca cca	2103
Leu Arg Asn Leu Val Phe Ser Gly Cys Gln Ile Thr Ser Met Pro Pro	
615 620 625	
aga ata gga tca ttg aca tgc ctt aag act cta gat tac ttt att gtc	2151
Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr Leu Asp Tyr Phe Ile Val	
630 635 640	
ggc gag agg aaa ggt tat caa ctt ggt gaa cta cgg aat cta agc cta	2199
Gly Glu Arg Lys Gly Tyr Gln Leu Gly Glu Leu Arg Asn Leu Ser Leu	
645 650 655 660	

cat ggt tca ctt tca atc tca cat ctt gag aga gtg aag agt gaa acg His Gly Ser Leu Ser Ile Ser His Leu Glu Arg Val Lys Ser Glu Thr 665 670 675	2247
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 Lys Cys Leu Lys Ile His Tyr Cys Tyr Ala Leu Glu Ser Leu Pro Glu
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Met Glu Lys Leu Asp Ala Ile Ala Asp Glu Arg Arg Lys Phe His Leu
115 120 125

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Val Leu Ala Glu Pro Lys Val Tyr Gly Arg Asp Lys Glu Lys Asp Glu
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Lys Gln Arg Ala Phe Gly His Gln Thr Glu Thr Asn Pro Ala Leu Val
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Gly Ile Gly Lys Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu Ala
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Ala Lys Thr Leu Gly Gly Leu Leu Arg Phe Lys Arg Glu Glu Ser Glu
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Trp Glu His Val Lys Asp Ser Glu Ile Trp Asn Leu Pro Gln Asp Glu
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Asn Ser Val Leu Pro Ser Leu Arg Leu Ser Tyr His His Leu Pro Leu
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Asn Leu Arg Gln Cys Phe Ala Tyr Cys Ala Val Phe Pro Lys Asp Thr
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Lys Ile Glu Lys Glu Tyr Leu Ile Thr Leu Trp Met Ala His Gly Phe
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Trp Lys Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Val Glu Glu Tyr
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Lys Phe Gly Asn Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu
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Arg Ser Leu Pro Lys Arg Leu Cys Lys Leu Gln Asn Leu Gln Thr Leu
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Asp Ile Ser Cys Cys Phe Ser Leu Ser Tyr Ile Pro Lys Gln Ile Ser
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Ser Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr Leu Asp
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Asn Leu Ser Leu His Gly Ser Leu Ser Ile Ser His Leu Glu Arg Val
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Ser Asn Leu Lys Ser Leu Lys Leu Ile Gly Phe Arg Gly Phe His Phe
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Pro Asn Trp Met Asn Ala Ser Val Leu Lys Asn Val Val Ser Ile Glu
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Cys Leu Glu Ser Leu Lys Leu Tyr Asn Gly Ser Ala Glu Val Glu Tyr
 770 775 780

Ile Glu Glu Asp Asp Gly His Ser Thr Leu Lys Phe Pro Tyr Leu Lys
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Arg Leu Ala Ile Glu Arg Phe Pro Asn Leu Lys Gly Leu Leu Arg Ser
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Glu Gly Glu Glu Lys Phe Ser Met Leu Glu Glu Met Glu Ile Trp His
 820 825 830

Cys Pro Met Phe Val Phe Pro Ala Phe Ser Ser Val Thr Lys Leu Asp

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Ile Ile Tyr Phe Lys Lys Leu Arg Glu Leu Pro Ser Ser Leu Ala Ser		
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Leu Asn Ala Leu Lys Cys Leu Lys Ile His Tyr Cys Tyr Ala Leu Glu		
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Ser Leu Pro Glu Gln Gly Met Glu Gly Leu Thr Ser Leu Thr Asp Leu		
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Tyr Val Gln Asn Cys Glu Met Leu Lys Cys Leu Pro Glu Gly Leu Gln		
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Phe Glu Lys Leu Gln Ser Thr Phe Thr Thr Ile Gln Ala Val Leu Glu	
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Asp Ala Gln Lys Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu	
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Gln Lys Leu Asn Ala Ala Ala Tyr Glu Ala Asp Asp Ile Leu Asp Glu	
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Cys Lys Thr Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys	
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Tyr His Pro Asn Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met	
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Phe His Leu Asp Glu Arg Thr Ile Glu Arg Gln Val Ala Thr Arg Gln	
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Asp Glu Ile Val Lys Ile Leu Ile Asn Asn Val Ser Asn Ala Gln Thr	
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Leu Pro Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr	
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Ile Lys Glu Ile Val Glu Ser Ile Glu Glu Lys Ser Leu Gly Gly Met	
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Asp 240	Leu	Ala	Pro	Leu	Gln 245	Lys	Lys	Leu	Arg	Asp 250	Leu	Leu	Asn	Gly	Lys 255	
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gaa Glu	gaa Glu	agt Ser	tct Ser	att Ile	ctg Leu	cct Pro	gcc Ala	ctg Leu	aga Arg	ctt Leu	agt Ser	tac Tyr	cat His	cac His	ctt Leu	2637
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		450					455					460				
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	465					470					475					
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	500	505	510	
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	515	520	525	
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	530	535	540	
tcc att gga gat Ser Ile Gly Asp	cta gta cat tta Leu Val His Leu	aga tac cta aac Arg Tyr Leu Asn	ttg tct ggc aat Leu Ser Gly Asn	3117
	545	550	555	
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	565	570	575	
cag act ctt gat Gln Thr Leu Asp	cta cat ggc tgt Leu His Gly Cys	cat tca ctt tgt His Ser Leu Cys	ttg cca aaa Cys Cys Leu Pro	3213
	580	585	590	
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	690	695	700	
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	705	710	715	
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Pro Val	Leu Pro	Ile Leu	Gly Met	Gly Gly	Leu Gly	Lys Thr	Thr Leu		
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Gln Pro	Tyr Glu	Leu Ser	Asn Leu	Ser Gln	Glu Asp	Cys Trp	Leu Leu		
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Phe Met	Gln Arg	Ala Phe	Gly His	Gln Glu	Glu Ile	Asn Leu	Asn Leu		
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Gln Trp Glu His Val Arg Asp Ser Glu Ile Trp Lys Leu Pro Gln Glu
370 375 380

Glu Ser Ser Ile Leu Pro Ala Leu Arg Leu Ser Tyr His His Leu Pro
385 390 395 400

Leu Asp Leu Arg Gln Cys Phe Thr Tyr Cys Ala Val Phe Pro Lys Asp
405 410 415

Thr Glu Met Glu Lys Gly Asn Leu Ile Ser Leu Trp Met Ala His Gly
420 425 430

Phe Ile Leu Ser Lys Gly Asn Leu Glu Leu Glu Asn Val Gly Asn Glu
435 440 445

Val Trp Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val
450 455 460

Lys Ser Gly Gln Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu
465 470 475 480

Ala Thr Ser Leu Phe Ser Ala Ser Thr Ser Ser Ser Asn Ile Arg Glu
485 490 495

Ile Ile Val Glu Asn Tyr Ile His Met Met Ser Ile Gly Phe Thr Lys
500 505 510

Val Val Ser Ser Tyr Ser Leu Ser His Leu Gln Lys Phe Val Ser Leu
515 520 525

Arg Val Leu Asn Leu Ser Asp Ile Lys Leu Lys Gln Leu Pro Ser Ser
530 535 540

Ile Gly Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Gly Asn Thr
545 550 555 560

Ser Ile Arg Ser Leu Pro Asn Gln Leu Cys Lys Leu Gln Asn Leu Gln
565 570 575

Thr Leu Asp Leu His Gly Cys His Ser Leu Cys Cys Leu Pro Lys Glu
580 585 590

Thr Ser Lys Leu Gly Ser Leu Arg Asn Leu Leu Leu Asp Gly Cys Tyr

595

600

605

Gly Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys
 610 615 620

Thr Leu Ser Arg Phe Val Val Gly Ile Gln Lys Lys Ser Cys Gln Leu
 625 630 635 640

Gly Glu Leu Arg Asn Leu Asn Leu Tyr Gly Ser Ile Glu Ile Thr His
 645 650 655

Leu Glu Arg Val Lys Asn Asp Met Asp Ala Lys Glu Ala Asn Leu Ser
 660 665 670

Ala Lys Glu Asn Leu His Ser Leu Ser Met Lys Trp Asp Asp Asp Glu
 675 680 685

Arg Pro Arg Ile Tyr Glu Ser Glu Lys Val Glu Val Leu Glu Ala Leu
 690 695 700

Lys Pro His Ser Asn Leu Thr Cys Leu Thr Ile Arg Gly Phe Arg Gly
 705 710 715 720

Ile Arg Leu Pro Asp Trp Met Asn His Ser Val Leu Lys Asn Val Val
 725 730 735

Ser Ile Glu Ile Ile Ser Cys Lys Asn Cys Ser Cys Leu Pro Pro Phe
 740 745 750

Gly Glu Leu Pro Cys Leu Lys Ser Leu Glu Leu Trp Arg Gly Ser Ala
 755 760 765

Glu Val Glu Tyr Val Asp Ser Gly Phe Pro Thr Arg Arg Arg Phe Pro
 770 775 780

Ser Leu Arg Lys Leu Asn Ile Arg Glu Phe Asp Asn Leu Lys Gly Leu
 785 790 795 800

Leu Lys Lys Glu Gly Glu Glu Gln Cys Pro Val Leu Glu Glu Ile Glu
 805 810 815

Ile Lys Cys Cys Pro Met Phe Val Ile Pro Thr Leu Ser Ser Val Lys
 820 825 830

Lys Leu Val Val Ser Gly Asp Lys Ser Asp Ala Ile Gly Phe Ser Ser
 835 840 845

Ile Ser Asn Leu Met Ala Leu Thr Ser Leu Gln Ile Arg Tyr Asn Lys
 850 855 860

Glu Asp Ala Ser Leu Pro Glu Glu Met Phe Lys Ser Leu Ala Asn Leu
 865 870 875 880

Lys Tyr Leu Asn Ile Ser Phe Tyr Phe Asn Leu Lys Glu Leu Pro Thr
 885 890 895

Ser Leu Ala Ser Leu Asn Ala Leu Lys His Leu Glu Ile His Ser Cys
 900 905 910

Tyr Ala Leu Glu Ser Leu Pro Glu Glu Gly Val Lys Gly Leu Ile Ser
 915 920 925

Leu Thr Gln Leu Ser Ile Thr Tyr Cys Glu Met Leu Gln Cys Leu Pro
 930 935 940

Glu Gly Leu Gln His Leu Thr Ala Leu Thr Asn Leu Ser Val Glu Phe
 945 950 955 960

Cys Pro Thr Leu Ala Lys Arg Cys Glu Lys Gly Ile Gly Glu Asp Trp
 965 970 975

Tyr Lys Ile Ala His Ile Pro Arg Val Phe Ile Tyr
 980 985